

CLAIMS

What is claimed is:

- 1 1. A magnetic head, comprising:
2 a free layer;
3 an antiparallel (AP) pinned layer structure spaced apart from the free layer, the
4 AP pinned layer structure includes at least two Fe-containing pinned
5 layers having magnetic moments that are self-pinned antiparallel to each
6 other, the pinned layers being separated by an AP coupling layer of Cr;
7 and
8 a high coercivity layer positioned towards the AP pinned layer structure on an
9 opposite side thereof relative to the free layer, the high coercivity structure
10 pinning a magnetic orientation of the AP pinned layer structure.

- 1 2. A head as recited in claim 1, wherein the free layer includes a layer of Fe.

- 1 3. A head as recited in claim 2, wherein the free layer further includes a layer of
2 NiFe.

- 1 4. A head as recited in claim 1, further comprising a spacer layer of Cr positioned
2 between the free layer and the AP pinned layer structure.

- 1 5. A head as recited in claim 4, wherein the spacer layer has a thickness of between
2 about 15 and 25Å.
- 1 6. A head as recited in claim 1, wherein the high coercivity layer is formed of
2 CoPtCr.
- 1 7. A head as recited in claim 6, wherein the CoPtCr is formed directly on one of the
2 Fe-containing pinned layers of the AP pinned layer structure.
- 1 8. A head as recited in claim 1, wherein the head forms part of a GMR head.
- 1 9. A head as recited in claim 1, wherein the head forms part of a CPP GMR sensor.
- 1 10. A head as recited in claim 1, wherein the head forms part of a tunnel valve sensor.
- 1 11. A magnetic head, comprising:
2 a free layer, the free layer including a layer of Fe;
3 an antiparallel (AP) pinned layer structure spaced apart from the free layer, the
4 AP pinned layer structure includes at least two Fe-containing pinned
5 layers having magnetic moments that are self-pinned antiparallel to each
6 other, the pinned layers being separated by an AP coupling layer of Cr;
7 a spacer layer of Cr positioned between the free layer and AP pinned layer
8 structure; and

9 a high coercivity layer positioned towards the AP pinned layer structure on an
10 opposite side thereof relative to the free layer, the high coercivity structure
11 pinning a magnetic orientation of the AP pinned layer structure.

1 12. A head as recited in claim 11, wherein the free layer further includes a layer of
2 NiFe.

1 13. A head as recited in claim 11, further comprising a spacer layer of Cr positioned
2 between the free layer and the AP pinned layer structure.

1 14. A head as recited in claim 13, wherein the spacer layer has a thickness of between
2 about 15 and 25Å.

1 15. A head as recited in claim 11, wherein the high coercivity layer is formed of
2 CoPtCr.

1 16. A head as recited in claim 15, wherein the CoPtCr is formed directly on one of the
2 Fe-containing pinned layers of the AP pinned layer structure.

1 17. A head as recited in claim 11, wherein the head forms part of a GMR head.

1 18. A head as recited in claim 11, wherein the head forms part of a CPP GMR sensor.

1 19. A head as recited in claim 11, wherein the head forms part of a tunnel valve
2 sensor.

1 20. A magnetic storage system, comprising:
2 magnetic media;
3 at least one head for reading from and writing to the magnetic media, each head
4 having:
5 a sensor having the structure recited in claim 1;
6 a writer coupled to the sensor;
7 a slider for supporting the head; and
8 a control unit coupled to the head for controlling operation of the head.

1 21. A magnetic storage system, comprising:
2 magnetic media;
3 at least one head for reading from and writing to the magnetic media, each head
4 having:
5 a sensor having the structure recited in claim 11;
6 a writer coupled to the sensor;
7 a slider for supporting the head; and
8 a control unit coupled to the head for controlling operation of the head.